



**ETHNOBOTANIC STUDY IN SAPI SONOK MADURA HERBAL AS A SCIENCE  
LEARNING RESOURCE FOR JUNIOR HIGH SCHOOL STUDENTS**

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**Abstract**

The lack of contextual learning in the field of science is one of the constraints in teaching and learning science. Contextual learning can be achieved by integrating local wisdom from the students' surroundings into science lesson plans. This approach serves as a bridge for introducing and preserving local wisdom by making it familiar to students. Through science learning based on contextual approaches, students can easily find real-life examples of scientific concepts that they study and observe in their daily lives. This research aims to describe the study of ethnobotany, or the types of natural materials found in one of Madura's local wisdom traditions, specifically the Madura Sonok cow herbal medicine. The findings of this study show a correlation between indigenous knowledge and scientific knowledge. The local community's knowledge of utilizing specific natural materials for livestock consumption, believed to have specific properties and benefits, is connected to scientific concepts in the study of natural materials or their classification. There are many types of scientific concepts that can be integrated with ethnobotany in the context of Madura Sonok cow herbal medicine, such as topics related to temperature and heat, elements, compounds, and mixtures, as well as the classification of living organisms. The method used in this study is a descriptive qualitative approach with data collection techniques based on field data (interviews with key informants) and supported by relevant articles. The data analysis employed in this study is inductive analysis. This research was conducted in the area known for the local wisdom of Sonok cows, specifically in West Waru, Pamekasan. The conclusion of this study is that the process of making Madura Sonok cow herbal medicine demonstrates connections with three distinct scientific disciplines: chemistry, physics, and biology.

**Keywords:** Ethnobotany, Ethnoscience, Natural Science Education.

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**INTRODUCTION**

Learning science has unique characteristics because it combines two different elements: theory and practice (Dendodi et al., 2024). Understanding science comprehensively is not only about grasping theoretical concepts but also requires the ability to link them with real-world phenomena. Context is crucial in science learning, as students should be able to recognize, study, and explore their surrounding environment. Science learning materials are inherently simple and can become engaging when aided by appropriate media (Wahyu et al., 2021). Based on interviews conducted with a science teacher for Grade VII at SMPN 1 Waru Barat Pamekasan, the teacher stated that they had developed interactive teaching materials using technology, specifically PowerPoint, with science content. However, a challenge faced by the teacher is that students feel bored and are less active. This happens because students prefer direct involvement in practical activities or real-life examples from their



environment. This aligns with research by Khoirunnisa et al. (2020), which explains that science requires students to think, work, and solve problems. Science is considered challenging because students often struggle to visualize what they are learning, especially when the material is abstract, leading to boredom and difficulty in understanding science (Yunarti, 2021). This presents a new challenge for educators to innovate teaching materials by integrating local wisdom into learning. Local wisdom is a unique characteristic of a region, including traditions, culture, art, and others. Education based on local wisdom seeks to incorporate these elements into learning, creating a relatable atmosphere that encourages student motivation and active participation (Suwanto et al., 2024).

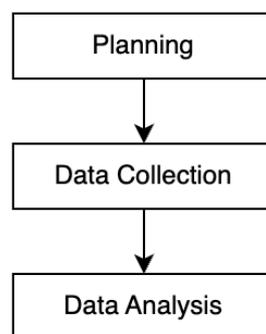
Research by Suwanto et al. (2024) on local wisdom-based learning videos demonstrated that students' knowledge increased after using videos integrating local wisdom. This shows that teaching materials or science learning media are more easily understood when associated with local wisdom from the area. Madura itself has many types of local wisdom, ranging from traditional foods, distinctive cultures, unique arts, and more. One well-known tradition in Madura is cow contests, which are divided into bull races and Sonok cow contests. Bull races involve speed competitions, while Sonok cow contests evaluate female cows based on their beauty and elegance. Local wisdom from Pamekasan, Madura, can be explored and connected to science learning. For example, aspects of Sonok cows, such as their selection (phenotype and genetics), the decorations used (production process and materials), and the herbal medicines given to the cows (natural materials), can be examined. The use of natural materials, believed to benefit living beings, is referred to as ethnobotany. Ethnobotany is defined as the study of the relationship between humans and plants, particularly their traditional uses in daily life. This description highlights that learning based on local wisdom provides opportunities to enhance education in Indonesia optimally to meet human resource needs and development goals. However, implementing such learning faces challenges, as research by Andayani et al. (2021) and Alfiana & Fathoni (2022) states. These include teachers' difficulties in identifying local wisdom and ethnosience concepts, a lack of training in developing integrated teaching materials, and limited time due to the extensive curriculum in science. Therefore, this study aims to explore one local wisdom element and its integration into junior high school science learning. The study contributes to the literature on Sonok cows and provides information that can be developed into media or teaching materials tailored by teachers to fit science topics. This research offers novelty by linking indigenous knowledge, such as the traditional use of plants (ethnobotany) in the context of Sonok cow herbal medicine, to junior high school science learning. The study focuses on exploring how much science material can be reviewed and connected with ethnobotany, specifically in the herbal medicine for Sonok cows, with the limitation that it only examines the primary materials used in Madurese herbal medicine production.

## **METHOD**

This study uses a qualitative approach that emphasizes inductive data analysis. Data collection techniques include interviews, observations, and documentation. This type of research falls under descriptive analysis, which is defined as a form of study aimed at describing or illustrating actual conditions related to phenomena found in the environment, whether scientific phenomena or the results of human engineering (Moleong, 2017). The objective of qualitative descriptive research is to systematically, factually, and accurately describe the topic under study and its application in science learning for middle school students. Qualitative descriptive research must be based on reliable data and trusted sources (Setyowati et al., 2023). The data serves as the foundation for describing the findings, while additional supporting data from related articles provides further context. The research data in this study includes the analysis results of local wisdom in a particular area, with other data sources obtained from supporting articles on related topics. The sample for this study was chosen using a purposive sampling technique. Purposive sampling is a common technique in qualitative

research (Sugiono, 2015), where the selection of samples is based on specific criteria, such as sources who are considered most knowledgeable about the topic being studied. In this study, resource persons were selected using this technique, with the primary source being the head of the Sonok cow community in the West Waru area of Pamekasan.

The literature review in this article is written based on the ethnobotany aspects of local wisdom. The data collection techniques for this study are sourced from relevant articles on the topic. Additionally, data collection techniques include documentation and interviews with the head of the Sonok cow community in the West Waru area, Pamekasan, Madura, conducted on September 18, 2024. The data analysis was carried out using content analysis of the interview data. The stages of data collection and analysis are presented in Figure 1.



**Figure 1. Steps data collection**

The steps for data collection and data analysis are as follows. In the planning stage, the researcher formulates the problem scope and research questions related to the ethnobotany study of the selected local wisdom. During this stage, the researcher also searches for relevant supporting articles on the research topic as initial references. In the data collection stage, the researcher collects research data related to the chosen local wisdom through interviews and recording the interview results. In the data analysis stage, the researcher analyzes the data obtained from the interviews, focusing on the related topic, and concludes the findings from the data processing results. The data analysis was conducted using an inductive approach, which begins with the facts found in the field, followed by analysis to develop statements connected to theories, laws, or other relevant findings. This approach emphasizes analyzing field data from the researcher's perspective to draw conclusions. According to Hasan (2011), an inductive approach is based on field findings and is followed by analysis and conclusion drawing from the researcher's viewpoint.

## **RESULTS AND DISCUSSION**

### **Findings Study**

The distribution of the questionnaire results regarding students' awareness of local wisdom that can be linked to science shows that the ethnobotany of Sonok Madura cow herbal medicine is not yet familiar to the students. Additionally, the students stated that they experience difficulties in learning science because they cannot find real-life examples of the material being studied in their surroundings. The results of the questionnaire are shown in Figure 2.

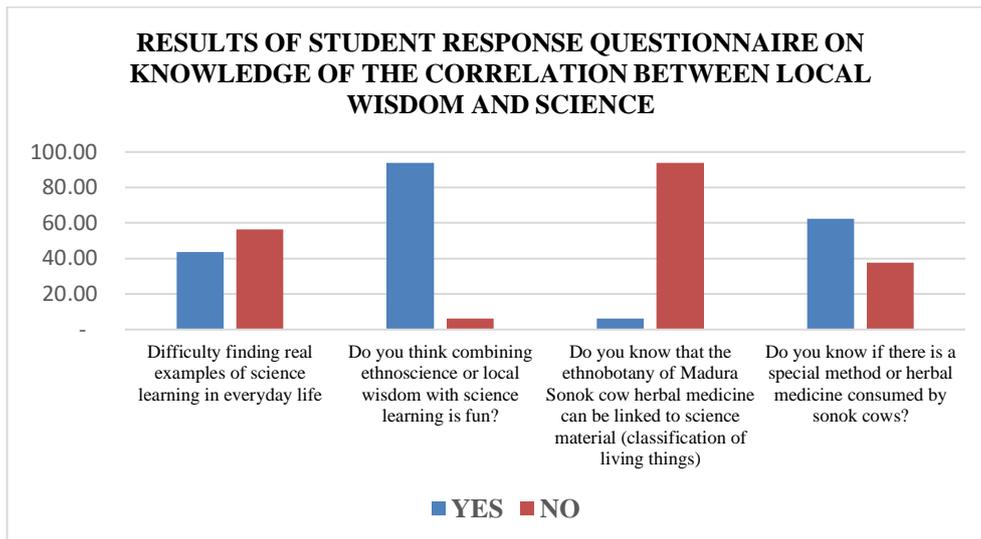


Figure 2. Questionnaire results

Local wisdom refers to unique characteristics possessed by a particular place, which can take the form of knowledge or other aspects, such as ethnobotany—public knowledge about plants and their benefits. According to Hayati et al. (2021), ethnobotany studies discuss traditional knowledge and experiences that improve the quality of life, not only for humans but also for the environment. Ethnobotany has many benefits, including knowledge about medicinal plants and their properties for preventing or treating diseases. One aspect of ethnobotany is the use of medicinal plants as the main ingredients in traditional remedies (Destryana & Ismawati, 2019). Siraj (2022) explains that ethnobotanical research is conducted to study knowledge, beliefs, and evolving practices in society that are closely related to medicinal plants, as well as to understand how humans process and classify these plants.

Ethnobotanical studies have recently developed into a means of examining the relationship between society, societal knowledge, and the environment (Anggraini, 2018). Implementing ethnobotanical knowledge as a foundation for learning in formal education is expected to encourage students to be more active, connect with their environment, and directly apply their knowledge in daily life. This approach also serves as a form of cultural preservation. Research by Sari et al. (2020) indicates that teaching materials based on local wisdom and ethnobotany, such as those related to customary forests, can assist both teachers and students in the teaching and learning process. This demonstrates that teachers should not solely rely on illustrations or examples provided in general textbooks but should also present real-life examples from the students' environment.

The use of ethnobotany as a tool to teach scientific concepts has also been supported by research findings. For instance, studies have shown that integrating ethnobotany into school-based learning can foster scientific understanding and revive knowledge of local wisdom. Projects involving ethnobotany motivate students to develop curiosity about their local environment (Flores-Silva et al., 2024). Research conducted in the Barcelona region, Spain, demonstrates that there is significant interaction between humans and plants in multicultural areas (D'Ambrosio et al., 2023). This provides an opportunity to explore and develop biocultural learning processes at both academic and non-academic levels. Similarly, Gutiérrez-García et al. (2020) found a significant relationship between scientific knowledge and ethnobotany education. Their study also highlighted the positive impact of integrating non-formal activities into academic settings, which not only introduces scientific concepts but also enhances botanical and ethnobotanical knowledge acquisition.



**Figure 3.** Cow sonok and cow herbal medicine sonok

Madura cattle are a local breed originating from Madura and are considered an important part of Indonesia's genetic resources. According to Herviyanto et al. (2020), Madura cattle have distinctive characteristics, including body colors ranging from yellowish paddy to brick red and reddish tan, a small to medium body posture, short legs, and pointed black hooves. The advantages of Madura cattle include their ability to adapt to low-quality feed, withstand the hot climate of Madura, and produce high-quality meat (Novianti et al., 2023).

Cow Sonok, a superior breed of Madura cattle, plays a significant role in preserving the original Madura cattle. Initial selection to identify Cow Sonok is based on their phenotypic characteristics and body size. Female Madura cows that meet the standard criteria for Cow Sonok are chosen and trained to participate in Cow Sonok contests. To maintain their health, fitness, and beauty, Cow Sonok is given an additional herbal supplement known as Cow Herbal Medicine Sonok. This herbal supplement is administered in the morning and consists of ingredients such as coconut milk, ginger root, temulawak extract, brown sugar, and water. It is provided routinely every two weeks (Herviyanto & Kuswati, 2024). Figure 3 visually represents the Cow Sonok and the herbal medicine used to maintain their condition, highlighting their cultural significance in Madura.

### Integration with Science

The topic of local wisdom discussed in this study includes the concept of ethnobotany, particularly in the herbal medicine used for Cow Sonok. Cow Sonok is a superior breed of Madura cattle that significantly contributes to the preservation of the original Madura cattle. The initial selection to identify Cow Sonok is based on their phenotypic characteristics and body size. Female Madura cows that meet the standard criteria for Cow Sonok are selected and trained to participate in Cow Sonok contests. To maintain their health, fitness, and beauty, Cow Sonok is given an additional supplement known as Cow Herbal Medicine Sonok. This herbal medicine is administered in the morning and consists of coconut milk, ginger root, temulawak extract, brown sugar, and water. The herbal supplement is given routinely every two weeks (Herviyanto & Kuswati, 2024). The findings regarding learning based on the ethnobotany of Madura Cow Sonok's local wisdom are presented in Table 1.

**Table 1. Findings Ethnobotany in Cow Herbal Medicine Madurese Sonok 1**

Component	Type	Learning
Science (Cattle Herbal Medicine Ingredients) Sonok)	Coconut 	Coconut ( <i>Cocos nucifera</i> ) is a tropical plant commonly found in tropical regions, and nearly all parts of the plant, from its leaves to its roots, can be utilized. This plant has benefits, including maintaining the elasticity of a cow's skin and enhancing the gracefulness of the cow's body. The coconut plant is classified as a monocotyledon with fibrous roots. It belongs to the same family as betel nut, aren, lontar, dates, sago, and oil palm. The

Component	Type	Learning
<p data-bbox="507 595 635 629">Tamarind</p> 	<p>classification of coconuts and their similarities to other plants is discussed in Grade VII science material on the classification of living organisms. Through this activity, students can learn and understand scientific knowledge with real-world examples from their surroundings. By connecting science material to aspects of local wisdom, students gain new learning experiences and deepen their understanding.</p>	
<p data-bbox="507 1144 635 1178">Curcuma</p> 	<p>Tamarind (<i>Tamarindus indica</i>) is a plant that benefits the health and color of a cow's hair. This tree can grow up to 30 meters tall and has a hard outer skin with brownish, sour-tasting pulp. Tamarind belongs to the family <i>Caesalpinioideae</i> and the genus <i>Tamarindus</i>. The classification of tamarind and its similarities to other plants are discussed in Grade VII science material on the classification of living organisms. Through this activity, students can learn and understand scientific knowledge with real-world examples from their surroundings. By connecting science material to aspects of local wisdom, students gain new learning experiences and deepen their understanding.</p>	
<p data-bbox="507 1619 635 1653">Turmeric</p> 	<p>Temulawak (<i>Curcuma zanthorrhiza</i>) benefits cows by increasing their appetite. This plant is the largest species within the <i>Curcuma</i> genus and has a spicy and bitter taste, with compound leaves. The classification of temulawak and its similarities to ginger and other plants are discussed in Grade VII science material on the classification of living organisms. Through this activity, students can learn and understand scientific knowledge with real-world examples from their surroundings. By connecting science material to aspects of local wisdom, students gain new learning experiences and deepen their understanding.</p> <p>Turmeric (<i>Curcuma longa</i>) is used as an antibiotic for cows. Turmeric is a common spice used by the community due to its richness in antioxidants. It belongs to the same family and genus as temulawak, classified within the genus <i>Curcuma</i>. Turmeric is characterized by its deep yellow or orange color and segmented skin. The classification of turmeric and its similarities to other plants are discussed in Grade VII science material on the classification of living organisms. Through this activity, students can learn and</p>	

Component	Type	Learning
		understand scientific knowledge with real-world examples from their surroundings. By connecting science material to aspects of local wisdom, students gain new learning experiences and deepen their understanding.

The utilization of plants in ethnosience-based learning has also been demonstrated by Khery et al. (2022), whose study highlighted the use of the Nyamplung plant, which can be utilized as a medicine or for cosmetic needs. Local wisdom related to cultural practices can be applied in the teaching and learning process in classrooms through structured and consistent integration tailored to scientific concepts. Table 2 provides details on the ethnobotanical study of Cow Herbal Medicine Sonok Madura, showcasing its integration into the learning process.

**Table 2. Ethnobotanical Study in Cow Herbal Medicine Sonok Madura 2**

Component	Type	Learning
Science	The process of making cow herbal medicine Sonok 	Cow Herbal Medicine Sonok is a traditional potion believed by the Sonok cow enthusiasts and breeders to maintain the quality of Grade A Madura cattle. The process of making Cow Herbal Medicine Sonok involves several stages, one of which is fermentation that lasts for several weeks or even months. Through this activity, students can learn about scientific concepts such as elements, compounds, and mixtures integrated into the production process. Additionally, this material can be linked to biotechnology in the fermentation process of Cow Herbal Medicine Sonok. It can also be connected to topics like temperature, heat, and expansion during the drying process of the herbal medicine.
	Cow herbal medicine color Sonok	The color of Cow Herbal Medicine Sonok, which is made from ingredients such as turmeric, ginger, and tamarind, tends to be dark and has a slightly rough texture due to the extracted plant essences. Through this activity, students can learn scientific concepts related to chemical and physical changes.

The research results show the integration of indigenous knowledge, passed down through generations, about the process of making Madurese Sonok cow herbal medicine with scientific knowledge about the benefits of the herbal medicine. The study indicates that the process of making Sonok cow herbal medicine is connected to three different scientific disciplines: chemistry, physics, and biology. Additionally, findings related to changes in the color of the herbal medicine can be associated with physical and chemical changes, which are also part of science material.

## CONCLUSION

The main finding of this study is the significant correlation between Sonok cow herbal medicine (its ingredients and manufacturing process) and scientific concepts. The study results highlight ethnobotany, or the traditional knowledge of utilizing various plants believed to serve as medicine for livestock. In this study, the ethnobotanical plants used in Sonok cow herbal medicine include

young coconut, tamarind, turmeric, and ginger. Through the conducted research, it was found that the most relevant science material to integrate with the local wisdom of Sonok cows, particularly their herbal medicine, is the Grade VII science material on the classification of living organisms. By analyzing and identifying the correlation between local wisdom and scientific concepts, the process of teaching science no longer faces challenges in finding real-life phenomena or examples. Science learning becomes less abstract and difficult to understand and can instead become engaging and interesting with visual examples derived from local wisdom. Further research is recommended to delve deeper into analyzing the correlation between indigenous knowledge and existing scientific knowledge in the context of Sonok cow herbal medicine. This should include distinguishing and dividing the correlations based on subchapters or topics in junior high school science materials to make it easier for educators to find references and create a structured discussion for use in learning materials or media. Additionally, it is recommended to gather more comprehensive information and data regarding the ethnobotany of Sonok cow herbal medicine across all districts in Madura, including Sumenep, Bangkalan, and Sampang, rather than limiting the study to Pamekasan, to obtain more concrete and extensive data.

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